## Space Weather Forecast

Issued on Sunday, 05 May 2024 at 12:15 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Further Moderate-class flares likely with a chance of Strong flares through the period. Minor-Moderate Geomagnetic storm conditions are likely on days 1 and 2 (5-6 May) given likely CME arrival, with a chance of isolated Strong storm intervals. Lowering chance of further geomagnetic activity days 3 and 4 (7-8 May).**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity is at High levels. A peak Strong flare recorded at 05/0601 UTC from the large a complex sunspot in the northwest, with another Strong flare ongoing and further Moderate flares during the period, mostly from this region. There are currently nine sunspot regions on the visible disc, with seven numbered, two unnumbered. The most active located in the northwest, with a large and complex sunspot. This region continues to show evolution in the magnetic structure. The second largest spot on the disc is located in the southeast, also with a complex magnetic structure evident. The remaining sunspots on the disc are generally smaller, stable or in slight decay, and magnetically simple.

A largely northward directed coronal mass ejection (CME) was observed following a Moderate flare early on the 5 May, analysis was undertaken on limited available imagery with modelling output awaited. No other obvious Earth directed CMEs have been observed, however updated coronagraph imagery is currently unavailable, and imagery is limited, therefore confidence is lower than normal.

**Solar Wind / Geomagnetic Activity:** Solar winds were at background levels, currently around 320-370km/s. The Interplanetary Magnetic Field was weak. The important north-south component was also weak. Resultant Geomagnetic activity was predominantly Quiet, with an isolated Unsettled interval prior to midnight UTC (Kp 1-3).

**Energetic Particles / Solar Radiation:** Solar radiation was at normal background levels.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Moderate to High solar activity is forecast to continue with further Moderate-flares expected and a chance of isolated Strong flares, principally from the large sunspot regions located in the northwest and southeast disc.

**Solar Wind / Geomagnetic Activity:** Three Earth-directed CMEs currently feature in the forecast period. The first may yet provide a glancing impact day 1 (05 May), the second more significant CME associated with the 03 May Strong flare is expected into the second half of the day 1 (05 May), with the third possibly glancing blow late day 2/early day 3 (6 to 7 May). Some fast wind influence from two coronal holes is also expected into days 1 and 2 (05-06 May) and could see speeds peak at elevated levels between days 2 and 3 (06 and 07 May) before slowly declining although CME influence may mask this signal.

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Combining possible effects from the various CMEs and coronal hole influences through the period results in a lower than average Geomagnetic forecast confidence.

Geomagnetic activity although initially Quiet, is expected to increase on day 1 (05 May), becoming Active to G1/Minor Storm with a chance of G2/Moderate to G3/Strong Storm conditions. Activity should generally subside through days 2-4 (06 to 08 May) to mostly Quiet conditions by the end of the period. Any glancing pass from 4 May CME could give a slight chance of reaching G1 levels late day 2/early day 3 (06 and 07 May).

**Aurora Forecast:** Combined coronal hole and CME effects are likely in the coming days increasing the chance of enhanced auroral activity. Aurora may be visible during the limited hours of darkness in parts of Scotland and Northern Ireland and perhaps visible across parts of northern England and North Wales where skies remain clear. Activity is most likely to be greatest Sunday into Monday, although timings of peak activity will be highly dependent on the arrival times of any enhancements.

**Energetic Particles / Solar Radiation:** Solar radiation levels is most likely to remain at background levels through the period. There is a slight chance for an S1/Minor Storm or greater event occurring throughout however, primarily from the large, complex sunspot region in the northwest disc.

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# Met Office Space Weather Forecast

**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 80 | 70 | 20 | 5 |
| Strong | G3 | No | 30 | 20 | 1 | 1 |
| Severe | G4 | No | 10 | 5 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 90 | 90 | 90 | 90 |
| Very Active | R3 to R5 X | Yes | 25 | 25 | 25 | 25 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 20 | 20 | 20 | 20 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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